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POSEABLE FIGURE AND SPINE SYSTEM FOR USE THEREIN

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation-in-part of co-pending U.S. Patent Application Serial No. 10/263,945 filed Oct. 3, 2002, which is a continuation of co-pending U.S. Patent Application Serial No. 09/620,862, filed July 21, 2000, now U.S. Patent No. 6,478,653, which is a continuation-in-part of U.S. Patent Application Serial No. 08/900,901 filed July 25, 1997, now U.S. Patent No. 6,110,002.

FIELD OF THE INVENTION

[0002] The present invention relates to poseable figures and in particular, a poseable figure having a novel spine system capable of being placed into numerous life-like poses.

BACKGROUND OF THE INVENTION

[0003] Articulated or poseable figures, such as dolls, are commonly used by children as toys and also collected by both children and adults. A common poseable figure has a human form including a torso, a head and a number of limbs or appendages that are moveable with respect to the torso. The shape or form of the figure is typically provided by molding the desired shape or form into the torso portion which is commonly made of a rigid material such as plastic. Ball and socket type joints are typically used to connect the appendages to the rigid torso.

[0004] Existing poseable figures, however, are not capable of accurately simulating life-like movement and maintaining life-like poses. In particular, the rigid torsos used in existing poseable figures are not capable of being moved in a way that simulates the movements and positions made possible by the human spine and torso. As a result, existing poseable figures cannot be used to simulate complex and subtle human movement and poses, for example, during athletic events. The ball and socket type joints used in existing poseable figures also do not provide the range of motion necessary for the figure to move in a way that simulates human movement. Typical ball and socket joints are either difficult to position because the joint is too tight or unable to remain in position because the joint is too loose. In addition, most dolls and

poseable figures are not capable of having various body shapes and sizes due in part to the hard, rigid material of the figure.

[0005] Poseable figures have been designed with a ball and socket spine system and a foam body, as disclosed in U.S. Patent Nos. 6,110,002 and 6,478,653. Although these figures allow realistic and life-like poses, the polyurethane foam body portion can be susceptible to tearing as a result of the wide range of movement and poses.

[0006] Accordingly, a need exists for a poseable figure having a spine system capable of a degree of movement that simulates life-like movement, that can be positioned in and maintain a variety of life-like poses, and that has a pliable body portion that can be made in various shapes and sizes. What is also needed is a poseable figure having a pliable body portion that moves with the spine system and conforms to the human-like movement and poses without tearing.

SUMMARY OF THE INVENTION

[0007] According to one aspect of the present invention, a poseable figure comprises a torso including a spine system having a first spine end and a second spine end and a plurality of mating spine segments articulated with each other. Each of the mating spine segments is engaged, in a friction fit, with an adjacent mating spine segment such that each of the mating spine segments swivels with respect to one another. Each of said plurality of mating spine segments includes a generally cup-shaped portion having an open concave receiving region and a rear wall and a ball-shaped portion extending from the rear wall of the generally cup-shaped portion. The ball-shaped portion of one of the mating spine segments is received in a concave receiving region of a mating one of the mating spine segments. A soft body portion is disposed around the spine system to simulate body flesh of the poseable figure. The soft body portion is made of a polymeric material, such as a polymeric gel material, such that the friction fit between the mating spine segments counteracts the memory of the material to allow various poses to be held.

[0008] According to another aspect of the present invention, a poseable figure comprises a spine formed of a plurality of articulated ball and cup joint elements. The ball and cup joint elements are friction fit, and the spine is variably positionable into a curvilinear arch. The poseable figure also comprises a torso portion covering the spine and conforming to the spine. The torso portion is made of a polymeric gel material.

[0009] In one embodiment, the poseable figure comprises an outer covering over the torso portion. In another embodiment, the poseable figure comprises a first set of appendages and a second set of appendages coupled to the spine and a head coupled to the spine.

DESCRIPTION OF THE DRAWINGS

[0010] These and other features and advantages of the present invention will be better understood by reading the following detailed description, taken together with the drawings wherein:

[0011] Fig. 1 is a front schematic view of the poseable figure according to the present invention;

[0012] Fig. 2 is a schematic view of two mating spine segments used in the poseable figure according to the present invention;

[0013] Fig. 3 is an exploded schematic view of a poseable figure having the spine system according to the present invention;

[0014] Figs. 4A-4E are views illustrating the range of motion and exemplary poses of the poseable figure;

[0015] Fig. 5 is an exploded view of a poseable figure according to another embodiment of the present invention; and

[0016] Fig. 6 is a perspective view of a poseable figure according to a further embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0017] A poseable figure 10, Fig. 1, according to the present invention includes a spine system 12 and a soft body portion 14 disposed around the spine system 12 to simulate the flesh of the poseable figure 10. The spine system 12 includes a plurality of mating spine segments 22 that are engaged with one another, in a friction fit, such that the spine system 12 can be bent, twisted and otherwise positioned into various poses in a life-like manner and remains positioned in the desired pose. The soft body portion 14 moves with the spine system 12 to simulate a variety of life-like poses and shapes.

[0018] According to the exemplary embodiment, the poseable figure 10 has a human form and likeness and includes a head 16, a first pair of appendages (arms) 18a, 18b and a

second pair of appendages (legs) 20a, 20b coupled to the spine system 12. However, the present invention contemplates using the spine system 12 with poseable figures having other types of animal or non-animal forms.

[0019] According to the preferred embodiment, each mating spine segment 22a, 22b, Fig. 2, includes a first portion 24a, 24b preferably defined as a cup shape and having a concave receiving region 26a, 26b. The segment 22 also includes a ball shaped portion 28a, 28b extending from the cup shaped portion 24a, 24b. The ball shaped portion 28a of one of the mating spine segments 22a is received, in a friction fit, within the concave receiving region 26b of a mating spine segment 22b. The mating spine segments 22a, 22b are thus capable of swiveling with respect to one another with a significant range of motion. The friction fit between the mating spine segments 22a, 22b, achieved by proper dimensioning of the parts, causes the mating spine segments 22a, 22b to be moved to a desired position and to remain in the desired position. The mating spine segments 22a, 22b are preferably held in the desired position exclusively by the friction fit between the ball shaped portion 28 and the cup-shaped portion 24.

[0020] In one example, the mating spine segments 22a, 22b are made of a molded plastic or other suitable material that produces a friction fit strong enough to counteract the memory of the soft material used for the body portion 14. Alternatively, the mating spine segments may also be machined. In one embodiment, the surface of the mating spine segments 22a, 22b can be roughened (e.g., by blasting with sand or glass) to increase the friction between the mating spine segments 22a, 22b.

[0021] The preferred embodiment of the spine system 12, Fig. 3, includes a first end spine segment 30 coupled to one of the mating spine segments 22a at a first spine end 31, and a second end spine segment 32 coupled to one of the mating spine segments 22c at the second spine end 33. A first appendage connector 34 couples the first pair of appendages 18a, 18b to the first end spine segment 30, and a second appendage connector 36 couples the second pair of appendages 20a, 20b to the second end spine segment 32 (for the sake of clarity, only one of the first and second pairs of appendages are shown in Fig. 3). A neck segment 38 is preferably coupled to the first end spine segment 30 and receives the head 16.

[0022] An elastic member 40 or other similar resilient device may extend through the mating spine segments 22a-22c, 30, 32, through the first and second appendage connectors 34,

36, and through the neck segment 38. The elastic member 40 is coupled to the head 16, using for example, a hook 42, such that the head 16 is engaged with the neck segment 38 and is capable of swiveling with respect to the neck segment 38. The elastic member 40 is also coupled to the second end spine segment 32, e.g., with a hook 44. The elastic member 40 thereby helps to maintain the spine system 12, first and second appendage connectors 34, 36, neck segment 38, and head 16 into engagement while allowing movement and positioning of the spine segment 12. Alternatively, a metal spring or bungee cord can be used in place of the elastic member 40.

[0023] The preferred embodiment of the first and second appendage connectors 34, 36 includes a pin or rod 46, 48 that extends through an aperture in the respective first end spine segment 30 and second end spine segment 32. Each of the pins 46, 48 include a pair of ball shaped appendage engaging members 50, 52 at respective ends of the first and second pins 46, 48 (only one of the pair is shown in Fig. 3, for the sake of clarity). In one example, the ball shaped engaging members 50, 52 are cast from a resin material, such as a polyurethane resin. In one example, the first and second pins 46, 48 include threaded bolts on which the ball shaped portions 50, 52 are threadably engaged. In another example, the pins or rods 46, 48 have a hexagonal or other similar shape and are glued to the ball shaped engaging members 50, 52 such that the ball shaped engaging members 50, 52 are prevented from rotating with respect to the pins or rods 46, 48.

[0024] Each of the appendages 18a, 20a includes a socket 54, 56 that receives a respective ball shaped engaging member 50, 52 such that the appendages 18a, 20a pivot with respect to the first and second appendage connectors 34, 36. A pressurized insert 58, 60, e.g. made of a silicone rubber or other compressible material, is disposed between the ball shaped appendage engaging member 50, 52 and the respective sockets 54, 56 of the appendages 18a, 20a, for applying pressure against the ball shaped appendage engaging member 50, 52.

[0025] According to one method, the pressurized inserts 58, 60 are formed from room temperature vulcanized (RTV) silicone. The ball shaped engaging members 50, 52 are placed into the respective sockets 54, 56 and the RTV silicone is pumped between the socket 54, 56 and the ball shaped engaging members 50, 52. The liquid silicone rubber preferably has a viscosity sufficient to flow into the socket while maintaining the capture of air bubbles during curing. The joint and the RTV silicone are then subjected to pressure, for example, in a range of about 40 to 150 psi, and heat such that the air bubbles in the silicone rubber are reduced in size while the

silicone rubber sets or cures. The silicone rubber material may be heated (e.g., at about 120°F) while pressurized to speed up the curing process and prevent bubbles from escaping.

[0026] Upon removing the pressure, the air bubbles entrained within the RTV silicone or other similar compressible material expand to form pressurized inserts 58, 60 that provide maximum contact between the ball shaped engaging members 50, 52 and the respective sockets 54, 56. The silicone material provides lubrication for the ball shaped engaging members 50, 52 to move freely within the sockets 54, 56 such that the appendages 18a, 20a are capable of swiveling into a wide range of positions. The pressure applied by the inserts 58, 60 against the ball shaped engaging members 50, 52 and the sockets 54, 56 maintains the respective appendages 18a, 20a in each position such that the poseable figure 10 can hold numerous life-like poses.

[0027] The present invention contemplates using this method of forming the sleeves with any type of ball and socket joint or other similar types of joints or bearings used to couple structural members in any application. Either the structural member having the ball or the structural member having the socket can be moved to effectively position the members. According to one alternative, the spine system 12 can be formed with multiple ball and socket joints having a pressurized insert made according to the above method.

[0028] In the exemplary embodiment, each of the appendages 18a, 20a includes multiple pieces coupled together with pivot and/or swivel joints. In the exemplary embodiment, each of the first pair of appendages (or arms) 18a includes at least an upper arm portion 62 pivotally coupled to a lower arm portion 64. A hand 66 can be pivotally coupled to the lower arm portion 64 with a wrist pin 68. The upper arm portion 62 can be formed in two pieces allowing additional movement of the arm about a longitudinal axis of the arm. The two pieces of the upper arm portion can be coupled with a ball and socket / pressurized insert assembly 63, as described above, or with other types of joints. The present invention contemplates additional segments or other types of joints in each of the first pair of appendages 18.

[0029] Each of the second pair of appendages 20 includes an upper leg portion preferably formed in two pieces 70, 71 with an upper leg joint 72 that allows relative rotation of the first and second upper leg portion pieces 70, 71 generally along a longitudinal axis extending through the upper leg portion pieces 70, 71. The upper leg joint 72 is preferably a ball and socket joint including a pressurized insert 73, as described above. The first upper leg portion piece 70 is

molded and then used to mold the second upper portion piece 71 to form the mating ball and socket joint. A lower leg portion 74 is pivotally coupled to the second upper leg portion piece 71, for example, with a pin 76. A foot portion 78, such as a boot, is preferably cast around the lower leg portion 74, allowing the foot portion 78 to move relative to the lower leg portion 74.

[0030] In one preferred embodiment, the soft body portion 14 covering the spine system 12 is made of a polymeric gel material formed over the spine system 12 using techniques known to those skilled in the art. For example, the polymeric gel material can be caste over the spine system 12 using a mold. Examples of the polymeric gel material include, but are not limited to, silicone gels. The gel material allows the spine system 12 to move with a wide range of movement into the various positions in a life-like manner and also resists tearing. The gel material also provides a body portion 14 that is more realistic to the touch. The gel material can be formed over the spine system 12 in various forms and body shapes. The soft body portion 14 can thereby be formed into any body type having any size, shape and figure. The soft body portion 14 may also be covered by separate items of clothing. Other types of polymeric materials that resist tearing can also be used for the soft body portion 14 including, but not limited to, visco elastic foam.

[0031] In one preferred embodiment, material such as a sleeve 88 can be placed around the spine system 12 before forming the soft body portion 14 to prevent the soft body portion 14 (e.g., the foam or gel material) from adhering to the spine system 12. One example of the material is a polyester material but any type of material that prevents adhesion of the soft body portion 14 can be used. Although sleeve 88 is shown in the exemplary embodiment, the material placed around the spine system 12 can also have different forms and thicknesses, for example, a thicker portion of material can be used in the belly region of the body portion 14.

[0032] According to the exemplary embodiment, the poseable figure 12, Figs 4A-4E, can be moved and set in various poses simulating the human form. Although the poses shown are of a figure skater, the present invention contemplates any type of athletic or non-athletic poses. In one pose, the spine system 12, Fig. 4A, can be bent slightly to simulate an arched back while the figure is standing upright. The spine system 12 and pliable body portion 14 allow this subtle aspect of the human form to be easily and accurately simulated.

[0033] In another pose, the spine system 12, Fig. 4B, and the soft body portion 14 allow the poseable figure 10 to be bent over forward. In this pose, the spine system 12 forms a slight

bend simulating the way in which a human back would bend when the individual is reaching down to touch her toes.

[0034] In another pose, the spine system 12, Fig. 4C, is given a more pronounced arch while one or more of the appendages 20b, 18a are extended and held in the extended position. In the preferred embodiment, the upper leg joint 72 allows the appendage 20b to rotate generally about the axis extending through the appendage 20b. This rotation of the appendage 20b allows the lifelike simulation of the leg of a human, such as a figure skater.

[0035] According to a further pose, the spine system 12, Fig. 4D, can be twisted and held by a friction fit in a twisted position. The twisted spine system 12 and soft body portion 14 thereby simulate the turning or rotating of the upper torso of the human body.

[0036] According to various other poses, the appendages 18a, 18b, 20a, 20b, Fig. 4E, can be pivoted, rotated, and moved into numerous positions to simulate human activities. In addition to those poses shown, the present invention contemplates numerous other movements and poses by positioning the spine system 12 and/or one or more appendages 18a, 18b, 20a, 20b.

[0037] Accordingly, the spine system 12 and soft body portion 14 allow the poseable figure 10 to have both a wide range of motion with numerous possible poses and to be capable of subtle poses that accurately simulate human form and movement.

[0038] According to another embodiment, the spine system 12, Fig. 5, can be used in other types of poseable figures 80 that simulate the human form. An alternative embodiment of the first and second appendage connectors 82, 84 can be used to couple appendages 84, 86 to the spine system. The appendages 84, 86 in this embodiment can also be formed in multiple pieces with pivot joints or ball and socket joints, as described above.

[0039] The spine system 12, Fig. 6, can also be used in other types of poseable or articulated figures 90 that simulate animals or other living or non-living animated figures. These alternative embodiments can be constructed with or without appendage engaging members and/or ball and socket joints as described above.

[0040] Accordingly, the poseable figure having the spine system according to the present invention has a wide range of life-like movement and can be positioned and maintained in numerous life-like poses. The novel ball and socket joints of the present invention covered by a soft body portion allow movement of the appendages of the poseable figure while holding the appendages in the desired position with no deterioration of integrity over time.

[0041] Modifications and substitutions by one of ordinary skill in the art are considered to be within the scope of the present invention which is not to be limited except by the claims which follow.